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ABSTRACT

The present study explored the effect of verbal dissembling on nonverbal behavior. Subjects were 146 females who were led to be either truthful or deceptive verbally to a confederate. The underlying affective state of the subjects and the publicness of the interaction between subject and confederate were also varied experimentally. The nonverbal behavior of the subjects was analyzed using objective scoring by trained coders and by showing samples of subjects' behavior to naive judges who rated how pleased the subjects appeared. Results showed that nonverbal behavior tended to reflect whether a subject was dissembling or being truthful. In addition, when they were truthful, subjects revealed their underlying affective states. However, when lying, there was no difference in nonverbal behavior according to the affect felt for the confederate. The nonverbal behavior of the subjects also tended to differ according to whether they were interacting publicly or privately; in public, subjects appeared more pleased with the confederate than in private. (Author)

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nonverbal disclosure of deception and interpersonal affect

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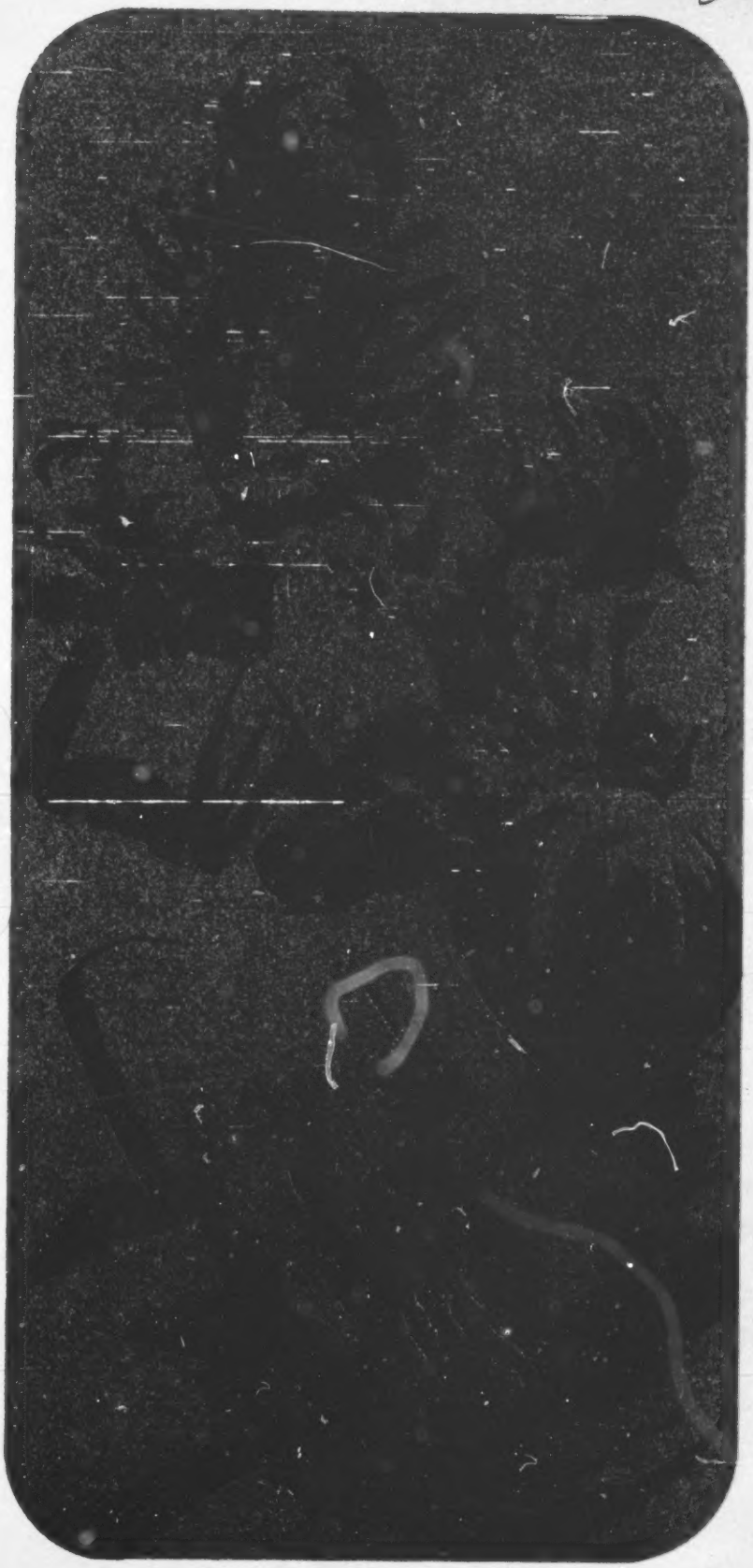

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WISCONSIN RESEARCH AND DEVELOPMENT CENTER FOR COGNITIVE LEARNING

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Technical Report No. 343

NONVERBAL DISCLOSURE OF DECEPTION AND INTERPERSONAL AFFECT

by

Robert S. Feldman

Report from the Project on Conditions of
School Learning and Instructional Strategies

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Wisconsin Research and Development Center
for Cognitive Learning
The University of Wisconsin
Madison, Wisconsin
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ABSTRACT

The present study explored the effect of verbal dissembling on nonverbal behavior. Subjects were 146 females who were led to be either truthful or deceptive verbally to a confederate. The underlying affective state of the subjects and the publicness of the interaction between subject and confederate were also varied experimentally. The nonverbal behavior of the subjects was analyzed using objective scoring by trained coders and by showing samples of subjects' behavior to naive judges who rated how pleased the subjects appeared. Results showed that nonverbal behavior tended to reflect whether a subject was dissembling or being truthful. In addition, when they were truthful, subjects revealed their underlying affective states. However, when lying, there was no difference in nonverbal behavior according to the affect felt for the confederate. The nonverbal behavior of the subjects also tended to differ according to whether they were interacting publicly or privately; in public, subjects appeared more pleased with the confederate than in private.

I

INTRODUCTION

As far back as the time of the ancient Greeks, nonverbal behavioral cues have been used to infer an individual's true feelings (Plutarch, c. 100). Yet it is only recently that systematic explorations of the variables involved in nonverbal behavior have been examined scientifically. Two recent review papers (Duncan, 1969; Wiener, DeVoe, Rubinow, & Geller, 1972) attest to the burgeoning interest in behaviors that fall under the rubric of nonverbal (including facial expressions, body movements, body posture and orientation, and eye gaze direction).

The present experiment deals with the effect of verbal dissembling on nonverbal behavior. It has been suggested, primarily by researchers with a psychoanalytic orientation, that an individual will reveal nonverbally his "true" affect under conditions in which there is motivation to hide veridical feelings (the paradigmatic example being when a person consciously lies). Freud (1925) made such a suggestion in saying, "He who has eyes to see and ears to hear may convince himself that no mortal can keep a secret. If his lips are silent, he chatters with his fingertips; betrayal oozes out of him at every pore [p. 94]." This passage suggests that Freud meant that the act of lying, per se, would lead to particular nonverbal behaviors, regardless of the content of the information withheld. However, while not explicitly mentioned by Freud, psychoanalytic theory also may be interpreted to suggest that the particular nature of the underlying feeling or thought will be revealed.

The hypothesis that there is nonverbal betrayal of affect under conditions of dissembling has received a degree of support from psychoanalysts, although only in anecdotal, case-history reports. For instance, Deutsch and Murphy (1955) used nonverbal behaviors as indicators of patients' repressed feelings, and Feldman (1959) presents a compendium of behaviors which he feels to be indicative of underlying, unacceptable feelings. However, such reports are unsystematic and their validity depends upon the perspicacity of the particular clinician in question.

There also has been some recent experimental work done on the nonverbal betrayal of affect by Ekman (Ekman & Friesen, 1969, 1974) and Mehrabian (1971). Both investigators seem to base their work loosely in a psychoanalytic framework. Ekman distinguishes between two types of nonverbal behaviors which may be the outcomes of deception: deception clues and leakage. Deception clues are behaviors which show that deception is occurring but do not reveal its content, while leakage behaviors are those which actually show the particular content of the underlying affect. Although drawing the distinction, the experimental work of Ekman and colleagues has examined only deception clues.

Ekman and Friesen (1974) placed subjects in a situation in which they were forced to say that they had enjoyed an exceedingly negative experience. Their nonverbal behaviors revealed signs of negative affect,

which untrained observers could identify. Unfortunately, it is not possible to determine whether the observers were responding to nonverbal behaviors which were indicative of the underlying negative affect (leakage) or simply to behaviors caused by engaging in any type of deception (deception clues).

Mehrabian (1971) based his research on the hypothesis that deception would lead primarily to signs of negative affect. In three studies, Mehrabian found that persons who were deceitful produced more nonverbal cues indicating negative affect than those who were being truthful. However, he did not consider the possibility that the particular nature of the affect that subjects felt might have been revealed nonverbally, and his data were collapsed across subjects with dissimilar underlying affective states. Thus, Mehrabian may have unwittingly missed cues which were indicative of the specific nature of the underlying affect, or, in Ekman and Friesen's terms, leakage cues. Thus, all systematic, experimental research to date has confounded nonverbal cues of covert affect and behaviors due to the dissembling per se. It is theoretically important to show that it is possible to distinguish between the two types of behaviors, and this is the aim of the present experiment.

The lack of experimental distinction between nonverbal behaviors which are indicative of a person's underlying affect (leakage) and those behaviors showing only that dissembling is occurring (deception clues) appears to be due primarily to the imprecision of the psychoanalytic model, since it is not readily possible to predict a given response from this theory. A more precise explanation may be based upon simple learning theory principles. If we assume that an individual's affective state results in the occurrence of nonverbal behaviors specific to that state, then elicitation of the underlying affect should result in such nonverbal behavior. Since verbal and nonverbal behaviors can and do occur independently, it is not necessary that the behaviors have congruent referents. Therefore, it is possible that the verbal expression of a fabrication can be accompanied by nonverbal behaviors appropriate not for what is being said, but rather for the actual underlying affect. This suggests, then, that an individual's nonverbal behavior will tend to reflect his actual felt affect, regardless of the nature of his verbal output.

In fact, there is reason for suggesting that lying may tend to enhance the nonverbal display of veridical affect. It is well documented that arousal tends to increase the occurrence of any well-learned response (Spence, 1956). Since it is clear that physiological arousal increases when a person is dissembling (Davis, 1961), there is potentially an even greater likelihood of a nonverbal response (congruent with felt affect) occurring than when a person is not lying. Following this line of reasoning, however, it is possible that lying may cause a sufficiently high level of arousal to enhance the occurrence of competing responses which would reveal that a person is lying. Thus, not only leakage may occur, but also there may be cues that a deception is occurring. Under all but relatively high levels of arousal, though, the cues revealing the nature of the deception ought to predominate.

The prior analysis must be modified, however, to take into account the finding that individuals will attempt to censor their nonverbal behavior as well as their verbal behavior under conditions of dissembling. For instance, Ekman and Friesen (1974) found evidence that persons try to inhibit and manipulate their facial expressions when attempting to deceive others, and evidence from the Mehrabian (1971) experiments on

nonverbal behavior showed higher levels of facial pleasantness when lying than when being truthful. However, Ekman and Friesen (1974) also report that individuals tend to inhibit and distort only their facial expressions when attempting to deceive others. Nonverbal behaviors of other types (particularly body orientation and posture) are not involved in attempts at inhibition, simply because individuals do not feel that nonfacial movements betray attitude. It is therefore predicted that facial expressions will appear more congruent with verbal behavior than the body when an individual is dissembling verbally, although attempts at facial deception may result in cues indicating that a fabrication is occurring without revealing the particular nature of the actual affect. In contrast, nonfacial types of nonverbal behavior are hypothesized to reveal the actual nature of the affect a person feels, regardless of whether his verbal statements are congruent with the true nature of his affect.

The previous analysis also implies that the degree of publicness of an individual's deceit--i.e., whether or not a person is under the scrutiny of the person to whom he is verbally lying--should tend not to affect his nonfacial nonverbal behavior, since there will be no attempts at inhibition under conditions of even public dissembling. In terms of facial nonverbal behavior, however, it could be predicted that there will be a difference between public and private dissembling, since under conditions of privacy the subject will not try to inhibit his facial expressions as he would under public conditions.

The hypotheses put forth above are based upon the assumption that particular nonverbal behaviors are related to particular affective states. There is a good deal of evidence to support such a notion. Ekman (1965) manipulated subjects' affective feelings toward an interviewer while secretly photographing the subjects. Untrained judges viewing sample still photos were able to discern the affect subjects felt for the interviewer. Mehrabian (1972) reports that positive affect is related to greater touching, closer position, greater forward lean, more eye contact, and more direct body orientation. Ekman, Friesen, and Ellsworth (1972) review data showing that facial expressions are related to emotions. Other such relationships are reviewed by Exline and Winters (1965), Hall (1964), Mehrabian (1972), and Sommer (1967). It is clear from the literature that particular nonverbal behaviors are lawfully related to affective states.

In the present study, the presence of a liked or disliked person is used to elicit an underlying affect which is either positive or negative, respectively. The rewarding and punishing quality of the simple presence of liked and disliked others has been demonstrated clearly by Lott and Lott (1968, 1969), who found that liked persons could act as effective positive reinforcers and disliked persons as negative reinforcers. In terms of the present formulation, this finding implies that the presence of a liked or disliked other should be sufficient to evoke nonverbal behaviors in a person which are indicative of positive or negative affect--regardless of whether the person is being verbally truthful or deceptive to the liked or disliked other.

To summarize, the proposed experiment investigates nonverbal behavior under conditions in which an individual is verbally dissembling or truthful. Using a teaching situation, the actual affect a teacher feels regarding his student and the veridicality and publicness of an evaluation given the student by the teacher will be orthogonally manipulated.

The basic hypotheses guiding the research are:

I. Nonverbal behavior will tend to reflect the affect a person is experiencing.
   (a) This affect will be revealed under conditions of both lying and truthfulness.
   (b) This affect will be revealed more through the body than through the face.

II. Nonverbal behavior will tend to reveal that a person is being deceptive.
   (a) The effect of lying, per se, should be less influential in determining a person's nonverbal behavior than the effect of the underlying affect.

III. Facial behaviors will tend to be different in public and in private, but nonfacial nonverbal behaviors will be similar publicly and privately.

The hypotheses will be tested using two strategies. Objective coding, using trained observers, will be carried out to determine the number of objective occurrences of particular nonverbal behaviors. The second method to be used is more subjective. Untrained, naive judges will rate samples of behavior from the subjects on the basis of how pleased they appear.

The information garnered from the two types of measures is somewhat different. The objective coding reveals differences between conditions in terms of magnitude of behaviors. The data from the naive observers is broader. Not only does it reveal differences between conditions, but it also shows the direction of the affect displayed by the subjects.

II

METHOD

SUBJECTS

Subjects were 146 University of Wisconsin female college freshman volunteers who were paid $1.25 for participation in what they were told was a study of experimental educational materials. Data from 23 subjects were not analyzed because of suspicion, and data from three subjects were not used because of experimental error or equipment failure. Attrition was fairly equal across experimental conditions; a chi square test showed that the percentage of subjects removed for suspicion did not differ according to condition ($\chi^2 = 6.97$, $p > .30$).

OVERVIEW

Subjects taught a confederate a brief lesson, following which they heard either a positive or negative evaluation of themselves designed to manipulate their liking for the confederate. After hearing the evaluation, they either publicly or privately administered a practice series of test questions which the confederate always answered correctly. Subjects then administered a final test in which the confederate either performed very well or very poorly. Since subjects were instructed always to praise the confederate--regardless of performance--they were either being truthful or lying when praising the confederate. Subjects were secretly video-taped while administering the exercises, and their nonverbal behavior was analyzed both by objective coding methods and by judgments of naive observers.

SPECIFIC PROCEDURE

Two subjects (one of whom was a confederate) reported to a room in a research building of the School of Education. The experimenter introduced himself as an educational researcher who had been working on a project to design materials which could be used by college-age students to teach other same-age students. He told the two women that they would simply be trying out some of the materials that had been developed. A rigged coin flip was held to assign the subject to the role of teacher and the confederate to the role of student.

In order to provide a rationale for the manipulation of liking, subjects were first asked to teach a brief structured lesson to the confederate. The subject was instructed to talk about herself during the

lesson in order to "relax" the confederate. This made it plausible for the confederate to later say that she liked or disliked the subject.

When the subject and confederate finished the lesson, the experimenter indicated to the confederate that he wanted to ask her some questions about her impressions of the lesson and have her fill out a brief questionnaire. He directed the confederate to enter another room, and he told the subject to wait for him and the other subject (confederate) to finish. He then said, "Oh, by the way, I'll place an intercom inside of the room so you'll be able to hear what the student says about the lesson. She doesn't know it's there but everyone who's been in the study always wants to know what the student says, and this is the easiest way of letting people know." The experimenter then casually placed an intercom speaker box on a table and left the subject alone.

Manipulation of Subject Liking for Student

The intercom was left with the subject in order to manipulate her liking for her student. The subject actually heard one of two prepared tape recordings played over the intercom loudspeaker. One recording had the student (confederate) articulating strong liking and praise for the subject, while the second recording had the student making derogatory, unfriendly remarks about the subject. Since research consistently shows that there is a high degree of reciprocity of liking (Berscheid & Walster, 1969), it was thought that this manipulation would result in the subject developing either positive or negative affect regarding the tutee. Subjects were randomly assigned to either the liking or disliking condition, and, since the appropriate tape recording was played by a third party, both the experimenter and confederate were blind as to the subject's condition.

The subject was given a new set of materials, supposedly designed to test the confederate on material unrelated to the earlier lesson. The test consisted of eight items. The subject was told to ask each question in the test and always to say "Right--that's good," whether or not the confederate responded correctly to each item. Subjects were told that this method of teaching was part of the experimental nature of the materials and that the purpose was to ensure that the student felt that she had done a good job by receiving a positive evaluation from her teacher.

Unknown to the subject, the copy of the test booklet given to the confederate had the correct answers inserted in code. This meant that the confederate performed consistently well with each subject, and it also meant that the positive feedback which the subject provided the student was entirely veridical. This practice test session was designed to familiarize the subject with the unusual teaching method of always giving positive feedback.

Manipulation of Publicness of Interaction

Prior to administering the practice session test, subjects were assigned randomly to either a public or private interaction condition. In the public interaction condition, the subject sat facing the confederate

as in the earlier part of the experiment. Thus, she was in full view of the confederate.

Half the subjects were assigned to the private interaction condition. In these cases a one-way mirror, resting on a table in another part of the room, was pointed out to the subject. She was told that it was a one-way screen, and that for the remainder of the experiment she would be seated in such a way that she would be able to see her student, but that her student would be unable to see her. Subjects in the private interaction condition were told that the reason for the use of the screen was to ensure that the student would not be able to see the teacher's materials. The subject was then seated in front of the screen, and the confederate was seated behind it.

After the subject finished the administration of the first test, she was given a second test booklet to administer to the confederate. There were 19 questions on the test, which was similar to exercises in a multiple choice analogy identification quiz. The items were drawn from a test devised by Jones, Rock, Shaver, Goethals, and Ward, 1968; the test was bogus, with no obviously correct answers.

Subjects were told that although the teaching method they were to use was identical to that used on the earlier test, the present exercises measured an entirely different skill. This procedure was designed to prevent a primacy effect in ability attribution, in which perceived performance on the upcoming test would be assimilated to the successful earlier performance. Subjects were again told to say "Right--that's good," whether or not the students' answers were correct. They were also provided with a set of statements to use at the end of the test, praising the student's performance and ability as follows:

> You've done very well on this exercise. In terms of percentiles for this test, these results put you in the top 5% of college-age students. According to the interpretation I've been given, these results suggest that you have quite good vocabulary skills, and that you probably write and speak with ease. It also suggests that you have a higher than average cognitive level. All in all, you've done very well.

If the subject had been in the public interaction condition, she continued the teaching session in this manner. Likewise, if she had been separated by the one-way screen (private condition), the interaction was resumed in this manner.

Manipulation of Truthfulness

The confederate's copy of the second test was marked with a code to indicate to the confederate what particular answer to give. There were two versions, one of which was randomly given to the confederate. In one version, the confederate answered correctly on 16 of the 19 test items and, to provide verisimilitude, incorrectly on 3 of the 19 items. This meant that the subject's positive feedback was almost always veridical, leading to the subject being placed in the Truthful Condition. In the other version, the confederate was made to answer erroneously on 16 of the 19 test items and correctly on 3 items. Thus, these subjects were put in the position of almost consistently lying to their student and were there-

fore in the Lying Condition. Neither the experimenter nor the confederate knew which test booklet version was used, since it was done on the basis of a code letter. Thus, both experimenter and confederate were blind to the condition.

Post-Experimental Questionnaire

After finishing the test, the subject completed a questionnaire which consisted of items assessing the subject's perceptions of the events of the experiment. These items served both as manipulation checks and as an assessment of subjects' suspicions. After completing the questionnaire, subjects were extensively debriefed, and the deception was explained.

Confederate's Behavior

The confederate was a 23-year-old female. She was trained in an attempt to keep her behavior, both verbal and nonverbal, constant with all subjects. She did not initiate conversation; rather, she was quite passive. She maintained the same body position throughout each session, whether or not she was able to see the subject (corresponding to the publicness manipulation). During the teaching session, she kept her eyes focused on the materials in her lap. Since she was blind to both the liking and lying manipulations, differential effects due to her behavior are unlikely.

Video- and Audio-Tape Recording

Video- and audio-tape recordings of subjects were made when the subject was administering the last test to the confederate. There was therefore about three minutes of recorded behavior for each subject. Two recordings were made simultaneously through one-way mirrors in the wall. One camera was stationed to get a frontal view of only the subject's face, while another camera was positioned to pick up the complete body of the subject. The facial view was taken at between 15° and 30° of a direct frontal shot, while the view of the body was taken from between 40° and 60° of a direct frontal view.

OBJECTIVE CODING

The video-tape recordings of the subjects were objectively scored by coders using a set of 31 categories. These categories were composed of six facial behaviors (head nod, head shake, smile, frown or grimace, pursing lips or tongue, eyebrow up, hand-to-hair, hand-to-face, head tilt), twelve body behaviors (relaxed or slouching position, rigid posture, rocking from side to side, rocking back and forth, forward lean, backward lean, arm jiggle, stand up, body reorientation, trunk swivel, fidget and squirm,

shrug), five hand behaviors (hand-to-body, hand-to-other, hand movement, object manipulation, gesticulation), and five leg categories (crossing leg, crossing ankle, leg movement, foot movement, and foot swing). The direction and length of subjects' eye gaze were also measured.

The coding system was non-hierarchical; each behavior was assumed to occur independently of all others. Behaviors (other than eye gaze) were scored in a binary fashion using 10-second intervals as the unit of analysis. Thus, behavior was scored either as occurring or not occurring during a given 10-second interval. Repeated occurrences of a behavior during a 10-second interval were scored as occurring only once.

Coding Procedure

Periods of time in which the subject was verbally giving either veridical or dissembling feedback to the confederate were used for coding. Three coders separately scored the data, although 15 percent of the data were jointly scored. Inter-rater reliabilities were calculated for each category of behavior for the jointly scored data. Reliability varied from between 1.00 to a low of .75. The modal reliability for all categories was .95. Eye gaze reliabilities showed a Pearson product-movement correlation coefficient of .84 for agreement on the proportion of glances made toward the confederate and was .95 for agreement on the proportion of time spent looking at the confederate.

Method of Analysis--Objectively Scored Data

Subjects were given a score for each category of behavior. The score was composed of the sum of the number of occurrences of a behavior during the 16 critical trials on the second test plus the mean number of occurrences for the 10-second periods during the free-praise periods at the conclusion of the second test. Since the mean ranged between 0 and 1, the possible total range of scores was between 0 and 17 for a category. Data for each behavior scored during the second test were analyzed in separate 2 x 2 x 2 analyses of variance. The three factors were truthfulness (lying or truth), liking (like or dislike), and publicness of interaction (public or private).

PREPARATION OF SAMPLES FOR NAIVE OBSERVERS

To test the hypothesis that the specific underlying nature of subjects' affect would be revealed nonverbally, samples of subjects' behavior were prepared to be shown to naive observers. Thirty-two 15-second samples of subjects' behavior were placed in a random order on master video-tapes. There were four samples from subjects in each of the eight experimental conditions. Each sample was taken from the point at which a subject praised her student after she answered the last question on the second test and on into the free-praise period, until 15 seconds had elapsed.

Two master video-tapes were made. One tape showed only the heads of each subject, while the other master tape showed only the bodies of the same subjects. The order in which subjects appeared on both master tapes was identical.

Judging Procedure

Observers were 37 female students enrolled in education classes. Observers viewed the clippings in groups ranging in size from 17 to 19. Within each group, approximately half the observers viewed the face tape at the same time as the other half viewed the body tape. Observers were randomly assigned to view either tape.

All observers heard similar instructions, which said that the people they would be seeing had been secretly video-taped while teaching a same-age student. The observers were told that in all cases the stimulus persons had been instructed to praise their students, regardless of the students' performances, which had varied. Observers were asked to try to determine how pleased the teacher was in each case by simply viewing her nonverbal behavior.

Observers were given a booklet containing 32 six-point scales. Each scale was labeled "very pleased with her student," "pleased with her student," "a little pleased with her student," "a little displeased with her student," "displeased with her student," and "very displeased with her student." Each 15-second clipping was then shown to the observers. There was a pause after each clipping to allow time to make the rating.

After viewing all the clippings, subjects were debriefed. All who so desired were told that they would receive a copy of the results when they were completed.

Method of Analysis--Naive Observer Ratings

Data from each observer's ratings were averaged to form eight scores corresponding to each of the eight conditions. Data from the ratings were then analyzed in a four-way mixed-design analysis of variance. The between-subjects factor was the part of the stimulus person the subject viewed (head or body), and the within-subjects factors were truthfulness, liking, and publicness of interaction of the stimulus persons.

III

RESULTS

MANIPULATION CHECKS

A questionnaire administered at the conclusion of the experiment provided evidence regarding the effectiveness of the experimental manipulations. In regard to the manipulation of truthfulness, subjects rated their positive feedback to the confederate as being significantly more accurate in the truthful condition than in the lying condition ($F = 168.26$, $p < .001$). Liking was assessed by the question "How much did you like your student as a person?" Subjects liked the confederate significantly more in the liking condition than in the disliking condition ($F = 39.15$, $p < .001$). Thus, it appears that the manipulations of truthfulness and liking had the desired effect. (The manipulation of publicness of interaction was not checked, due to its obviousness to subjects.)

DATA FROM OBJECTIVE CODING

Analysis of the data from each separate category revealed a very low frequency of occurrence for individual behaviors. The median score for the means of the 31 behaviors was .56. Since the potential range of scores was between 0 and 17, this is obviously a rather low figure. In addition, the scores within each category were not normally distributed, but rather were skewed toward the low end of the scale, with a high number of zero scores. Thus, the discrete categories were combined into larger behavioral units.

Three categories were formed which related to facial nonverbal behaviors: (1) positive facial movements, (2) negative facial movements, and (3) other facial movements. The positive facial category was formed by combining smiles and head nods. The negative facial category consisted of frowns and head shakes. Finally, the other facial category included pursing lips and tongue movements, eyebrow up, and head tilts.

Three additional categories were formed using behaviors consisting of nonverbal movements of the body: trunk movements, arm and hand movements, and leg and feet movements. The trunk movement category was the broadest, consisting of the behaviors of relaxed posture, rigid posture, rocking from side to side, rocking back and forth, leaning forward, leaning back, standing up, body reorientation, trunk swiveling, fidgeting, and shrugging. The arm and hand movement category included hand-to-body, hand-to-hair, hand-to-face, hand movement, object manipulation, and gesticulation with hand. The leg and foot category consisted of leg crossing, leg jiggling, foot movement, and swinging feet. The data from each new category were analyzed in a 2 x 2 x 2 analysis of variance, with the factors of truthfulness, liking, and publicness of interaction.

Results of the analyses of variance carried out for the three categories of facial behavior revealed no significant main effects or interactions. However, the analyses of variance conducted on the three derived categories of nonfacial nonverbal behaviors did show significant interactions due to treatments. Differences of interest between the means within the interactions were analyzed using the Duncan multiple range test (Duncan, 1955, 1957). The measure of trunk movement showed a significant interaction between the factors of truthfulness and liking ($F = 4.87$, $p < .05$). Examination of the means involved in the interaction (Table 1) showed that for subjects who were dissembling there was no difference in trunk movements according to the subject's affective state. However, when the subjects were telling the truth, there were significantly more trunk movements when the subject liked her student than when she disliked her student ($p < .05$, Duncan test). There were no other significant effects or interactions found on the trunk movement variable.

Table 1

Means for Coded Nonverbal Behaviors

Variable	Lie		Truth	
	Like	Dislike	Like	Dislike
Positive Facial Movements [a]	9.19	10.27	9.53	9.83
Negative Facial Movements [a]	1.71	1.60	2.89	1.60
Other Facial Movements [a]	9.53	10.11	7.50	9.43
Trunk Movements [a]	7.16	8.15	10.08	7.18
Arm and Hand Movements [a]				
Public Condition	13.16	14.64	14.80	12.48
Private Condition	17.47	16.27	11.94	15.61
Leg and Feet Movements [a]	4.59	3.32	3.81	3.72
Eye Gaze				
Proportion of Time Spent Looking	.004	.009	.026	.004
Proportion of Glances	.014	.036	.051	.014
Observer Ratings [b]	3.77	3.77	4.05	3.76

[a] Greater occurrences of behavior are indicated by higher scores.

[b] More positive ratings are indicated by higher scores.

The analysis of variance on the measure of arm and hand movements showed a significant three-way interaction among truthfulness, liking, and publicness of interaction ($F = 5.08$, $p < .05$). No other interactions or main effects were significant for this variable. The means pertaining to the significant interaction on the arm and hand movements variable are shown in Table 1. For both the public and private conditions, the general pattern of the means was the same as that found earlier in the truthfulness x liking interaction on trunk movements. Again, the difference between liking and disliking was markedly greater when subjects were being truthful than when they were lying. Under private conditions, the difference between liking and disliking subjects was significant when telling the truth, but not significant when lying. Under public conditions this same pattern was found but was somewhat less pronounced, and the difference between liking and disliking did not reach statistical significance for either truthful or lying subjects. Still, the general pattern was a repetition of that found for the trunk movement variable.

The analysis of variance carried out on foot and leg movements showed no significant effects or interactions. Apparently, only trunk and arm and hand movements were affected by the experimental manipulations. In general, the results of the analysis of the nonfacial nonverbal behaviors showed that when being truthful, subjects tended to display differential nonfacial nonverbal behavior according to their underlying affective states. However, when dissembling, there was little difference as a result of actual affect.

Eye Gaze

Two scores were available for each subject for the analysis of eye gaze, the proportion of time spent looking at the student and the proportion of number of times the student was looked at. For proportion of time measure, the main effect of publicness of interaction was significant ($F = 8.04$, $p < .01$). Subjects spent a greater proportion of time looking at the confederate when they could be seen by her than when they could not ($\bar{X} = .018$, public; $\bar{X} = .004$, private). There was also a significant interaction between the factors of truthfulness and liking ($F = 7.65$, $p < .01$). The means for this interaction show a familiar pattern. When being truthful, there was a significant difference in proportion of time spent gazing at the confederate according to whether she was liked or disliked (Table 1). But under conditions of lying, the difference between subjects who liked or disliked the confederate was small and nonsignificant. This is, of course, the identical pattern found on the measures of trunk and arm and hand movements.

Results regarding the proportion of times the confederate was looked at were similar to data from the length of gaze measure. Again, the publicness main effect was significant ($F = 6.60$, $p < .05$). Subjects looked at the confederate more often publicly than privately ($\bar{X} = .043$ versus $\bar{X} = .015$, respectively). The truthfulness x liking interaction was again also significant ($F = 7.69$, $p < .01$). However, while the means were in the same pattern as in previous truthfulness x liking interactions, differences were not as strong as in earlier data. The Duncan range test did not show that any means were significantly different from one another. Yet, inspection of the general pattern of means does show that there was a greater difference under conditions of truthfulness between liking and disliking subjects than under conditions of lying--the same results found

earlier. There was also a significant three-way interaction between truthfulness, liking, and publicness ($F = 4.09$, $p < .05$), but this merely appears to reflect a lower overall frequency of looking done in private, which decreased differences in means relative to the public conditions.

JUDGMENTS OF NAIVE OBSERVERS

Information concerning the particular direction of affect displayed by subjects nonverbally was obtained by having naive observers judge how pleased with the confederate a sample of subjects appeared. This information is particularly important as it provides a measure of the degree to which underlying affect is revealed nonverbally. Observers viewed 32 15-second samples which were comprised of four subjects from each of the eight conditions. Results from the observer ratings were analyzed in a mixed-design four-way analysis of variance which had one between-subjects variable (viewing face or body) and three within-subjects factors, corresponding to the three conditions of the original experiment (truth/lie, like/dislike, and public/private).

The analysis of variance table for the observer data is shown in Table 2. The main effects for lying, liking, and publicness of interaction were all significant ($F = 5.62$, $p < .025$; $F = 5.04$, $p < .05$; and $F = 11.57$, $p < .001$, respectively). The main effect for part of body shown was not significant. Inspection of the means revealed that stimulus persons (teachers) were rated as being significantly more pleased with their students when the teachers were telling the truth than when they were lying to students ($\bar{X} = 3.90$, truth; $\bar{X} = 3.77$, lying). Stimulus persons were also rated as being significantly more pleased with their students when they liked rather than disliked them ($\bar{X} = 3.91$, liking; $\bar{X} = 3.77$, disliking). Finally stimulus persons were rated as being significantly more satisfied with their students when the teacher responded in public than in private ($\bar{X} = 3.95$, public; $\bar{X} = 3.73$, private). In terms of overall main effects, both lying and dislike had a negative effect on the nonverbal behavior of subjects. In addition, subjects appeared to be more pleased with their students in public than in private.

These findings support the hypothesis that the affect a person feels for another will be revealed nonverbally, and that lying per se also tends to affect nonverbal behavior. It was also hypothesized that the liking variable would have a stronger effect than the lying variable on nonverbal behavior, but this hypothesis was not supported. Tests of the strength of the two effects, using Hays' (1963) estimate of amount of the variance accounted for by each effect, showed that the effect for lying was slightly stronger than the effect for liking. Lying accounted for 7.04% of the variance, while liking accounted for 6.21%.

The analysis of variance also showed that the main effects were modified by a number of significant interactions. Differences of interest between the means in these interactions were analyzed using the Duncan multiple range test. There was a significant interaction between body part and truthfulness ($F = 9.29$, $p < .001$). Analysis of the means revealed that ratings of the face of the stimulus person was significantly more positive when the person was being truthful than when she was lying ($p < .05$). However, observers did not distinguish stimulus persons who were lying from those telling the truth when observing the body only.

Table 2

Analysis of Variance--Observer Ratings

Source	SS	df	MS	F
Body (A)	.670	1	.670	.70
S(A)	33.422	35	.955	
Lie/Truth (B)	1.510	1	1.510	5.62**
A x B	2.495	1	2.495	9.29***
S(A)B	9.399	35	.269	
Like/Dislike (C)	1.413	1	1.413	5.04*
A x C	.073	1	.073	.26
S(A)C	9.818	35	.281	
B x C	1.470	1	1.470	4.30*
A x B x C	1.380	1	1.380	4.03
S(A)BC	11.973	35	.342	
Public/Private (D)	3.708	1	3.708	11.57***
A x D	.016	1	.016	.05
S(A)D	11.218	35	.321	
B x D	7.465	1	7.465	88.56***
A x B x D	.054	1	.054	.64
S(A)BC	2.950	35	.084	
C x D	3.902	1	3.902	12.67***
A x C x D	3.894	1	3.894	12.64***
S(A)CD	10.781	35	.308	
B x C x D	1.002	1	1.002	3.62
A x B x C x D	.097	1	.097	.35
S(A)BCD	9.691	35	.277	

*$p < .05$

**$p < .025$

***$p < .01$

This pattern of means was directly contrary to the notion that the body is more revealing than the face when a person is being deceptive. Facial nonverbal expressions tended to reveal deception, but nonverbal behaviors of the body were not rated differentially according to whether the stimulus person was lying or telling the truth.

There was also a significant interaction between the truthfulness and liking factors ($F = 4.30$, $p < .05$). Examination of the means (Table 1) shows that stimulus persons being truthful revealed cues indicative of their underlying affect for their student. According to results of the Duncan test, observers rated stimulus persons as being significantly more pleased when they liked their students than when they disliked them ($p < .05$). However, this difference did not hold under conditions of lying. When a subject was being deceptive, there was virtually no difference in the ratings according to whether she liked or disliked her student. The pattern of means is almost identical to the interactions between lying and liking found for trunk movements, arm and hand movements, and eye gaze. Thus, the data indicate a stable finding: when the subject is being truthful, cues are emitted indicating the underlying affective state; but when the subject is deceptive, there is little difference in nonverbal behavior as a result of affect.

Further significant interactions were found in the analysis of variance for the lying and publicness factors ($F = 88.56$, $p < .01$). Examination of the means shows that teachers who were telling the truth were adjudged as significantly more pleased when they were in public than when they were in private ($p < .01$). However, ratings of stimulus persons who were lying to their students showed only a small nonsignificant difference between public and private conditions. Interestingly, the means under conditions of lying showed the opposite (although nonsignificant) directional trend from that found when being truthful. When lying, stimulus persons were judged as being less pleased publicly than privately.

Two other interactions were significant: liking x publicness ($F = 12.67$, $p < .025$) and body part x liking x publicness ($F = 12.64$, $p < .01$). The means involved in the liking x publicness interaction showed that affect was displayed differentially according to whether the person was interacting publicly or privately. Teachers who liked the confederate were rated as being equally pleased in public and in private. However, teachers who disliked the confederate were seen as being significantly more pleased in public than they were in private. The difference between liking and disliking was small and nonsignificant in public, but was significant in private. This relation was further modified by the three-way interaction of body part x liking x publicness. Examination of the means revealed that the teachers were rated as being more pleased in public than in private when they disliked their student, and this held both for ratings of the body and the face. However, when the student was liked, the face was rated more positively in public, but the body was rated more positively in private. It appears from these results that types of nonverbal behaviors emitted are not equivalent between public and private conditions.

IV

DISCUSSION

The present experiment was designed to explore the nature of nonverbal behavior which occurs during dissembling. It was proposed that nonverbal behavior may not only reflect that an individual is lying, per se, but may reveal the particular content of the underlying feelings that the individual is attempting to withhold. Results of the research showed that, as predicted, nonverbal behavior does discriminate between subjects who are being truthful or dissembling verbally. Contrary to hypothesis, however, the results showed no difference in subjects' nonverbal behavior according to their underlying affective state when they were lying. Only under conditions of truthfulness was the actual affect revealed nonverbally. In addition, there were differences in nonverbal behavior under public and private conditions.

The clearest and most discriminating data came from the ratings made by the naive observers. These results are especially meaningful in terms of the hypotheses of the study, because they allow a determination of the direction of displayed affect, whereas the objective measures can only show differences between conditions in magnitude of behaviors. Results of the observer judgments showed that the ratings of how pleased the stimulus persons appeared were higher for the subjects who liked the student than for those who disliked the student. Thus, in general, the underlying affect the subjects felt was revealed nonverbally. In addition, lying led to nonverbal behavior that was interpreted as showing less pleasure than when subjects were being truthful. These findings were modified by the interaction between truthfulness and liking which showed that only subjects who were being truthful revealed the true affect they felt for the student. Lying subjects were rated as showing displeasure regardless of whether the student was liked or disliked.

The ratings of the judges also revealed a difference between public and private nonverbal behavior. When the student could see them, subjects were rated as being more pleased than when the student could not see them. Thus, there seems to be an attempt at self-presentation involved in the subjects' behavior, in which they adopt a more pleasant demeanor publicly than privately.

The basic findings of the naive observer judgments--the truthfulness and liking interaction--were replicated in the results of the objective coding of behaviors, although the overall main effects found in the observer judgments were not significant. Two conceptually independent sets of measures, trunk movements and eye gaze, revealed the same pattern of results. There was a difference in behaviors according to underlying affect under truthful situations, but no difference when being deceptive. In addition, measures of hand and arm movements, although complicated by a higher order interaction, showed essentially the same pattern.

The consistency of the finding of the truthfulness x liking interaction among the objective measures and the observer judgments increases the confidence we may place in it. It appears to be quite clear that there is no simple isomorphism between behavior displayed while being truthful and while lying, as was predicted. Rather, behavioral differences due to affect seem to be suppressed when lying; the underlying affect seems to be unimportant in its effect on nonverbal behavior.

These findings do not support the Ekman and Friesen (1969) theory of deception clues and nonverbal leakage. It appears that only lying, by itself, is manifested by nonverbal responses (in their terms, deception clues). Nonverbal behaviors indicative of the nature of the underlying affect--that is, nonverbal leakage--occurred not under conditions of deception, but only when subjects were being truthful. This finding helps to clarify the results of the Ekman and Friesen (1974) study, in which subjects were asked to differentiate between stimulus persons who were lying about viewing an unpleasant film and those being truthful about seeing a pleasant one. If the present results may be generalized, it seems likely that observers were differentiating stimulus persons on the basis of deception clues and not on the basis of the nonverbal leakage of positive and negative affect.

The results of the ratings by the naive judges in the present study may be interpreted as being inconsistent with Ekman and Friesen's theory concerning which part of the body best discriminates deceptive and truthful performance. The present results clearly reveal that observers viewing the face judged it as showing significantly more displeasure when lying than when being truthful, but that ratings of the body did not differentiate lying and truthful subjects. Thus, the face--not the body--was best discriminated on the basis of how pleased it appeared. If nonverbal deception cues are typically manifested as negative behaviors, then present results are not congruent with the Ekman and Friesen hypothesis that the body is more revealing than the face.

Although the finding that the face was a better discriminator between lying and truthful behavior may simply be a function of the inability of naive judges to decode accurately nonfacial behaviors, it may indicate that the face shows so-called "micromomentary expressions." First noted by Haggard and Issacs (1966), "micromomentary expressions" consist of very rapid changes in facial expression, followed by a reversion to the predominate expression. Observers are generally unable to perceive the content of the changes in expressions, but are able to tell that "something" has happened. If these "micromomentary" changes in expression were occurring, observers may have used them as a basis for their ratings. These changes in expression could not have appeared in the objective coding results because of their rapidity, and this might account for the lack of discrimination found for facial expressions in the objective coding results.

It is interesting that the eye gaze data discriminated between subjects who liked and disliked the student under conditions of truthfulness, in view of the very low proportion of time that was spent looking at the student. In the present task-oriented situation--which is rather atypical of the usual experimental setting in which eye gaze is examined--the mean overall proportion of time spent gazing at the confederate was just .08. Yet the present results are entirely consistent with the typical findings regarding the relation between looking behavior and liking

(Ellsworth & Ludwig, 1972; Exline & Winters, 1965): the confederate was looked at a greater proportion of the time when she was liked than when she was disliked (under conditions of truthfulness). Eye gaze thus appears to be a very discriminating measure, even under conditions where there is a low frequency of occurrence.

THEORETICAL CONSIDERATIONS

It is possible to explain the present findings in terms of the theoretical model originally presented. It will be recalled that the hypotheses were based on a simple stimulus-response model which posited that nonverbal behavior would reflect primarily a conditioned response to the presence of a liked or disliked person. Thus, it should have made little difference, in terms of nonverbal behavior, whether the subject was being truthful or lying; the salient factor should have been, according to the theory, the affect felt for the student.

The lack of difference in nonverbal behavior when lying between subjects who liked and disliked the confederate can be seen as being consistent with the theory if one considers the factor of arousal. It has been established empirically that physiological arousal tends to increase when an individual is dissembling (Davis, 1961). If this is the case, then a relatively high level of arousal should have existed when subjects were lying. This high level of arousal increases the probability of occurrence of well-learned responses associated with the affect. But a sufficiently high level of arousal will at the same time increase the probability of other responses occurring, many of which may be incompatible with the affect felt for the student. These other behaviors may result in a total pattern of nonverbal performance that is completely different from the appearance of similar affective states under conditions of lower arousal (i.e., under conditions of truthfulness). In order to apply this argument to the present findings, it is necessary to assume that nonverbal behavior occurring under high arousal does not occur in addition to responses to affect, but predominates over the affective cues. This would explain the lack of difference in nonverbal behavior between the liked and disliked conditions for subjects who are lying.

Although the previous explanation is consistent with the theoretical rationale for the development of the hypotheses, a serious problem becomes evident when results of the study are examined in light of the manipulation of the publicness of interaction. To be consistent with the theory, little difference in nonfacial nonverbal behavior should have appeared between public and private situations. This was not the case. The observer judgments showed that subjects were more pleasant in public than in private, considering both facial and nonfacial behaviors. In addition, a three-way interaction between body part, liking, and publicness showed differential behavior between public and private nonfacial behavior both for liking and disliking subjects. Results from the objective measures of proportion of glances made toward the confederate and number of arm and hand movements also revealed differential behavior publicly and privately. These findings make the arousal explanation for the present data less compelling. Still, the differences between public and private performance are not in a consistent pattern across different measures, and it is difficult to rule out this explanation entirely. Future

research might examine this explanation directly. Arousal could be manipulated orthogonally with truthfulness and underlying affect, perhaps by varying the importance of successfully lying or by manipulating the number of observers present in the situation. The prediction would be that as arousal decreased when lying, there would be an increase in the cues indicative of the underlying affective state.

If the arousal explanation is incorrect, several alternatives may be put forward. It is possible that attentional factors may be involved. When telling the truth, subjects' attention may be less focused on the task at hand; their interest may lie more toward the affect felt for the interactant. When lying, however, individuals' attention might be focused more on the lying itself, and their affective feelings may be less salient. In this case, one would expect only the lying itself--and not the underlying affect--to have an effect on nonverbal behavior.

Another explanation involves the more cognitive factor of guilt. Subjects who are lying may tend to feel guilty, and this may be the predominating determinant of their affective state. Such a state would certainly be negative, and individuals might be presumed to show such negative affect nonverbally. When being truthful, however, the affective state of the subject may be entirely determined by his feelings toward the confederate, and this would result in differential nonverbal behavior. A similar explanation may be put forward based upon a fear of detection which would be operative only under circumstances of lying.

It seems unlikely that either the guilt or fear of detection explanations are appropriate for the present findings, however. Subjects were lying in a way that was supposed to make the confederate feel successful, and it is unlikely that much guilt was aroused. Likewise, fear of detection of the lying was probably not high in the present study.

Perhaps the simplest explanation is that under conditions of lying the subject attends much more closely to his nonverbal behavior than when he is being truthful in an attempt to control cues that he is lying. Doing so results in minimization of differential affective expression, leading to appearances which mask the affect which is actually felt. When a person is being truthful, however, his attention is focused more on the task at hand and thus there is more betrayal of underlying affect.

The present data do not provide definitive evidence regarding the locus of causality for the findings. Future research is obviously needed to determine the appropriate explanation--or set of explanations--for the finding of a lack of distinction in nonverbal behavior toward liked and disliked persons when lying.

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